

REMARKS

A. Restriction

The examiner required that the claims be restricted to two inventions as follows: invention I, consisting of claims 1-10; and invention II, consisting of claims 11-35. Applicants elect, with traverse, claims 1-10 to continue prosecution, affirming the provisional election by applicants' representative. To advance the prosecution, applicants cancel the non-elected claims.

B. Rejection of Clims 1-6 under 35 USC 102(b) over Caporiccio (US 5,210,123)

The rejection is traversed because Caporiccio disclosure is incorrect and is not fact-based.

As the examiner noted, Caporiccio discloses a grease composition comprising (I) a thickening agent comprising a vinylidene fluoro-hexafluoroisobutylene copolymer powder and (II) a liquid lubricant (Abstract; column 1, lines 54-68). Component (I) can also comprise PTFE or copolymer thereof (column 2, lines 25-38).

Component (II) is (i) a telomer of chlorotrifluoroethylene having a viscosity of about 10 to about 1000 cS at 40°C; (ii) a fluorosilane copolymer; or (iii) a perfluoropolyether having a viscosity of about 30 to about 10000 cS at 20°C (column 1, lines 61-68). Also as the examiner noted, component (iii) has a formula of



Caporiccio also discloses that structures (d), (e), and (g) can be produced according to the methods disclosed in British patent GB 1,104,482, Italian patent IT 933,753, EP 0344547, and EP 0340793 (column 4, lines 23-28). Applicants submit herewith GB 1,104,482, EP 0344547, and EP 0340793. IT 933,753, however, is not currently available to applicants, in all databases available to applicants.

Caporiccio further discloses that structures shown in formula (f) are available from Daikin (Japan) (see, e.g., EP 0 148,482) (column 4, lines 28-30).

As shown in the attached EP 148 482B1, a polyether comprising repeat units of the formula $-(CH_2CF_2CF_2O)_a-$ (polyether II) is produced by ring-opening polymerizing 2,2,3,3-tetrafluorooxetane (Abstract; page 2, lines 4-6). This formula

(II) polyether is used to produce polyether (III) by fluorination (paragraph bridging pages 7 and 8).

When polyether (II) having an group of the formula $-\text{OCH}_2\text{CF}_2\text{COF}$ or $-\text{OCH}_2\text{CF}_2\text{COOH}$ is fluorinated, a mixture of a compound having an end group of $\text{OCH}_2\text{CF}_2\text{COF}$ or $-\text{OCH}_2\text{CF}_2\text{COOH}$ and an end group of $-\text{OCH}_2\text{CF}_2-\text{COF}$ or $-\text{OCH}_2\text{CF}_3$ is obtained (page 10, lines 3-10).

It is noted that the end groups contain acid fluoride end group having 3 carbon atoms and fluorohydro group having 2 carbon atoms. These end groups are not *perfluoroalkyl* groups having at least 3 carbon atoms, as required by applicants' claims 1-6. It is also noted that the end groups do not have the formula of $\text{C}_r\text{F}_{(2r+1)}-\text{A}-\text{C}_r\text{F}_{(2r+1)}$, where r is 3-6 and substantially free of perfluoromethyl and perfluoroethyl, as required by applicants' claims 3 and 6.

The closest disclosure in EP 0 148 482B1 is on page 11, line 20, $\text{C}_3\text{F}_7\text{OCF}(\text{CF}_3)\text{CF}_2\text{O}(\text{CF}_2\text{CF}_2\text{CF}_2\text{O})_n\text{CF}_2\text{CF}_3$, which has a 2 carbon end group and a 3 carbon end group, not a perfluorinated polyether recited in applicants' claims, which require that if the end group has 3 carbon atoms, both must be C_3F_7 . It does not disclose a product with C_3 on each end, as required in applicants' claims.

The disclosure in EP 0 148 482 demonstrates that Caporiccio does not refer to formula (f) as having perfluorinated end groups having 3 or more carbon atoms. Such disclosure may refer to formulae (c)-(e), which are not related to the examiner's rejection.

Therefore, formula (f) disclosed in Caporiccio does not anticipate claims 1-6.

Referring to GB 1,104,482, it discloses a process for producing products containing $-\text{C}_3\text{F}_6-\text{O}-$ and $-\text{C}_3\text{F}_6-\text{O}-\text{O}-$ units, either alone or with $-\text{C}_2\text{F}_4-\text{O}-$ and $-\text{C}_2\text{F}_4-\text{O}-\text{O}-$ in a polymer chain (page 1, lines 42 to 47). A general characteristics of the products is the presence in the molecule of functional groups having an acid character (page 4, lines 96-99). The most part of these consists of acid fluoride groups, $-\text{COF}$ (page 4, lines 99-101).

GB1,104,482 does not disclose or suggests end groups. Therefore the disclosure in Caporiccio is not fact-based, is incorrect, and is misleading.

The GB 1,104,482 disclosure further demonstrates that the products, i.e., formula (g) disclosed in Caporiccio, do not meet the requirements recited in

applicants' claims. These requirements are (1) perfluoroalkyl groups having at least 3 carbon atoms, as required by applicants' claims 1-6 and (2) end groups having the formula of $C_rF_{(2r+1)}-A-C_rF_{(2r+1)}$, where r is 3-6 and substantially free of perfluoromethyl and perfluoroethyl, as required by applicants' claims 3 and 6.

EP 0 344 547 discloses perfluoropolyethers predominantly composed of the formulae $-C_2F_4-O-$ and $-CF_2C(CF_3)FO-$ units (page 2, lines 1-14) and have the general formula of $R'_fO(CF_2CF_2O)_m(CF_2C(CF_3)FO)_n(CF_2O)_p(C(CF_3)FO)_qR'_f$ (page 2, lines 30-40, repeat units in *italics* is not shown in formula (g) of Caporiccio). This formula is not the same as formula (g) disclosed in Caporiccio, which is $R'_fO(CF_2CFO(CF_3))_q(CF_2CF_2O)_s(CF_2O)_rR'_f$. In the examples (pages 5-6), EP 0 344 547 discloses using ^{19}F -NMR to show that all products made are mixtures of various end-groups and none has two perfluoro C_3 end groups.

EP 0 344 547 does not teach this methodology. Further, the process for producing these products is known as a 'free radical' process, again, one known to have little control over both the ratios of m to n to p to q but also to the polymer terminus.

EP 0 340 793 discloses a process for generating lymphocytes transfected with one or two expression vectors containing chimeric T-cell receptors (page 3, column 1, lines 1-6). It is not of interest to the examiner's rejection.

In summary, the disclosures in GB 1,104,482 and EP 0 344 547 demonstrate that Caporiccio does not refer to formula (g) as having perfluoroalkyl end groups having 3 or more carbon atoms. Caporiccio disclosure must refer to formulae (c)-(e), which are not related to the examiner's rejection.

Therefore, formula (g) disclosed in Caporiccio does not anticipate claims 1-6.

C. Rejection of Claims 1-10 under 35 USC 102(b) over Moggi (US 5,077,097)

The rejection is traversed for the following reasons. The only Moggi perfluoropolyethers of interest to the examiner's rejection are classes 4-6 (column 3, lines 32-47). As discussed below, these products do not have end groups recited in applicants' claims.

Class 4 products, $O-(CF(CF_3)CF_2-O)_w$, are DuPont Product (Moggi, column 3, lines 64-66), generally known as Krytox[®]. However, DuPont has never been able to

make, until the discoveries disclosed in this application, the class 4 products. Moggi disclosure that class 4 products are made by DuPont is incorrect, speculative, and not fact-based. Submitted herewith is a Rule 132 declaration, indicating such products were not made prior to this invention, by inventor Howell who has been working for DuPont for more than 23 years in perfluoropolyethers.

Class 5 products, according to Moggi (column 3, lines 67-68), are disclosed in US 4,523,049 (Lagow), attached to this response. However, Lagow expressly discloses in column 4, lines 55-59, that $R_f = CF_2, C_2F_5$. As such, it shows that the known end groups contain less than 3 carbon atoms. These products (having one- and two-carbon end groups), as recited in applicants' claims are substantially absent. Again, Moggi disclosure that class 5 products are made according to Lagow is incorrect, speculative, and not fact-based.

Class 6 products, according to Moggi (column 3, line 68 to column 4, line 1), are disclosed in EP 148,482. However, as discussed above, EP 148,482 does not disclose perfluoroalkyl groups having at least 3 carbon atoms, as required by applicants' claims 1-10. It is also noted that the end groups do not have the formula of $C_rF_{(2r+1)}-A-C_rF_{(2r+1)}$, where r is 3-6 and substantially free of perfluoromethyl and perfluoroethyl, as required by applicants' claims 3, 6, 9, and 10.

These facts show that the Moggi disclosure is incorrect.

Rule 132 Declarations

As discussed above and attached to this response are Rule 132 declarations by inventor Jon Howell, Professor Darryl DesMarteau of Clemson University and Professor Joseph Thrasher of the University of Alabama, all have extensive experience in fluorocarbon chemistry and are experts in the field of fluorinated polyethers.

For example, Jon Howell spent his entire, over 23-year experience with DuPont in fluorochemicals. Professor DesMarteau has 37 years of working experience in fluorocarbon chemistry and extensive knowledge of processes used by the world's major perfluoropolyether producers (DuPont, Daikin, and Ausimont; patents of these producers are cited in Caporiccio and Moggi as discussed above). Professor Thrasher has over 22 years of experience in fluorocarbon chemistry. As Professor Thrasher's declaration (page 4, last sentence in the paragraph bridging

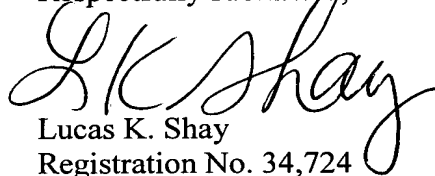
pages 3 and 4, his experience is in fluorocarbon chemistry, especially perfluoropolyethers.

These declarations show that one skilled in the art could not have made a perfluoropolyether comprising two 3-carbon-end groups or at least 3 carbon atoms, prior to the disclosure of the present invention. These declarations further show that Caporiccio and Moggi are factually incorrect.

In conclusion, none of the patents disclosed in Caporiccio and Moggi discloses or suggests a perfluoropolyether having perfluoroalkyl radical end groups with at least 3 carbon atoms per radical and is substantially free of perfluoromethyl and perfluoroethyl, and a 1,2-bis(perfluoromethyl)ethylene diradical, $-\text{CF}(\text{CF}_3)\text{CF}(\text{CF}_3)-$, is absent in the molecule of said perfluoropolyether; and, if one end group has 3 carbon atoms, both end groups must contain 3 carbon atoms. Therefore, the claimed invention is not anticipated by either Caporiccio or Moggi.

For the foregoing reasons and discussions, applicants respectfully request that the objections and rejections be withdrawn.

Respectfully submitted,



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